Small Business Innovation Research/Small Business Tech Transfer

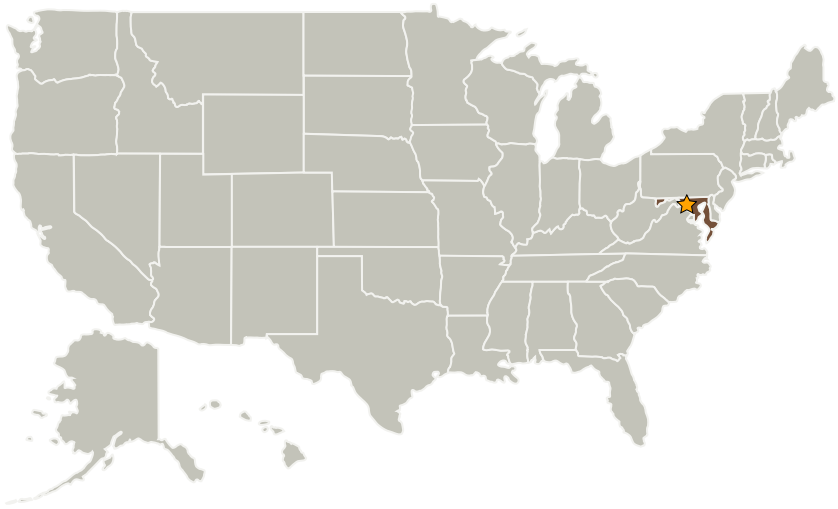
Electronic Modeling and Design for Extreme Temperatures, Phase II

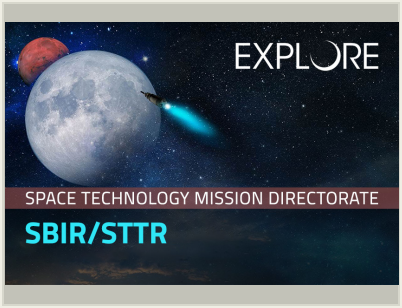
Completed Technology Project (2009 - 2011)

Project Introduction

We are developing CAD tools, models and methodologies for electronics design for circuit operation in extreme environments with focus on very low temperatures (<20K). These new tools and methodologies will give rise to circuit designs that minimize the requirements for external heat sources that are currently often necessary for operation of low-temperature electronics. Such technology would significantly improve reliability, performance and lifetime of electronics that are used for space applications, including satellites and space travel. This will be achieved through the development of unique circuits and simulation tools that are derived from novel physics-based modeling techniques and verified by experiment. Temperature-stable designs and design methods will be provided as well. The new cryogenic design tools will greatly reduce the chances of error during actual circuit implementation, and thus reduce the number of design cycles, thereby substantially decreasing fabrication times and expenses. Models and CAD tools are relatively inexpensive as compared to fabrication costs; thus the results of this project should provide a very large return on investment.

Primary U.S. Work Locations and Key Partners





Electronic Modeling and Design for Extreme Temperatures, Phase II

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
CoolCAD Electronics, LLC	Supporting Organization	Industry	Takoma Park, Maryland

Primary U.S. Work Locations
Maryland

Project Transitions

September 2009: Project Start

March 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.3 Avionics Tools, Models, and Analysis
    - TX02.3.1 Electronics Development Tools